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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/692,075
Filing Date: October 19, 2000
Appellant(s): HARRIS, KEN

Maria Eliseeva (43,328)
For Appellant

SUPPLEMENTAL EXAMINER'S ANSWER

This is in response to the appeal brief filed July 6, 2005 and the reply brief of June 13, 2007 appealing from the Office action mailed June 03, 2004. The Supplemental Examiner's Answer is also in response to the Remand Order of June 30, 2008, which instructs the examiner to consider the arguments of the appellant found on pages 4-5 of the Appeal brief and those found in the Reply Brief filed June 13, 2007 and issue a supplemental Examiner's Answer clearly addressing these arguments on the record. The Remand Order requested an analysis of the references, particularly referring to the human translation of the Kataoka et al. JP 08-039572. Any added

language in the description of the references appears in the Ariel Font. Kathryn Gorgos (TQAS, TC1700) signs this as a TC1700 Director Designee.

Information Disclosure Statement filed 08/21/2008

The information disclosure statement of 08/21/2008 has been received, considered and made of record. As signed copy of the PTO-1449 accompanies this mailing.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the Reply Brief of 06/13/2007 is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

5,279,689	Shvartsman	01/1994
5,104,768	Sassmannshausen et al.	04/1992
5,521,030	McGrew	05/1996
0766142	Fan et al. (European Patent, in English)	04/1997
5,452,282	Abraham	09/1995
6,010,825	Hagen et al.	01/2000
5,374,469	Hino et al.	12/1994
08-039572	Kataoka et al. (Japan) (with machine translation and human translation)	02/1996
IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393		08/1987

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A) Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), in view of Shvartsman '689 and Kataoka et al. JP 08-039572.

IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987) teaches the formation of a holographic surface relief grating including spin coating a photosensitive polyimide to form a uniform coating (no seams), pre-baking at 85 degrees C, exposing the polyimide with light from a HeCd laser to record the holographic image (at room temperature), and a postbaking/development at 225 degrees C. The polyimide allows dry or wet development, which is disclosed as an advantage.

Shvartsman '689 describes the coating of a photohardenable film on a substrate, embossing a pattern into it, curing it while in contact, peeling and transferring the relief image in the photohardened film to another surface by stamping. (8/56-9/21) The use of roller or flat die shapes is disclosed. (9/22-55). See also the examples. Holograms can include images and or text stored holographically. The coating of a holographic relief mold with a UV or electron beam curable resins, curing the resin and separating these is disclosed as known in the

art (2/1-6). The use of a photoresist image as an embossing surface without the need for further processing such as forming a nickel master is disclosed. (1/52-60)

Kataoka et al. JP 08-039572 (machine translation attached) teaches the use of a patterned
photosensitive polyimide on the interior surface of a mold. These are pre-heated at 50 degrees
and post-baked at 240 degrees in the examples. [0031]. The human translation of Kataoka et al. JP 08-039572 describes the steel mold surface being coated with a polyimide precursor, followed by heating to 160 degrees C to half-imidize the polyimide precursor layer and the process shown in figure 1 used, with final curing (completing imidization) at a temperature of 300 degrees C. ([0035], translation on page 19). The process of figure 1 describes the coating of the photosensitive polyimide, contacting this with the photomask bearing the desired embossing pattern, UV exposure to cause crosslinking in the exposed areas (negative acting), removal of the photomask (illustrated), dissolution of the areas which were not crosslinked by exposure and a final heating to fully form the polyimide. ([0025-0029], translation at pages 15-17)

It would have been obvious to have modified the process of IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987) as discussed above, by forming a surface relief hologram in the photosensitive polyimide formed holographic/grating mold by coating the polyimide precursors from solution onto the relief surface based upon the teachings of casting resins onto relief surfaces and curing by exposing to UV light (by Shvartsman '689 and the casting of polyimide and other resins by Kataoka et

al. JP 08-039572) to crosslink the polyimide, removing it from the relief pattern, heat curing (postbaking) it and later using it to replicate itself in other materials as stamping is disclosed by Shvartsman '689 and Kataoka et al. JP 08-039572 who establish that cured photosensitive layers, including polyimides are known to be useful as masters for stamping and molding and the teachings of the pre-exposure bake (solvent removal) and post exposure bake by Kataoka et al. JP 08-039572 and evidence of the use of embossing of the photosensitive layer and curing it while in contact with the master as taught by Shvartsman '689 as this allows more rapid hologram formation than using the exposure and development process of IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987) as it clearly obviates the use of a development step to achieve the relief image.

B) Claims 28, 33, 35 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sassmannshausen et al. '768, in view of IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), Shvartsman '689, Kataoka et al. JP 08-039572, Fan et al. EP 0766142 and McGrew '030.

Sassmannshausen et al. '768 teach the use *of positive acting polyimide* resists for

fabricating relief structures useful in fabricating microelectronics and printing plates. (1/11-30).

Processing of the polyimide resists includes coating, pre-baking at 50-120 degrees C,

exposure

(at room temperature), aqueous alkaline development and post-baking at 200-400 degrees C.

(6/23-7/39).

Fan et al. EP 0766142 describe seamless resist coatings, which are useful for forming

seamless printing plates. (5/9-17). The use of printing cylinders allows continuous printing.

(2/30-34). The polymer coatings used are solid films wrapped around the cylinder (9/9-46).

McGrew '030 discloses that the transfer layer may be a photoresist applied to the roller

from a tank of liquid photoresist, which would not leave a seam in the photosensitive coating

allowing continuous embossing (1/44-54, 2/56-59, 4/25-46 & 6/66-17) and is disclosed as useful in the printing arts. (4/26-38). The use of positive resist is disclosed (3/57-62). After development of the pattern, the pattern may be transferred into the underlying layer by etching. See figures 4-8 concerning light exposure of the resist.

It would have been obvious to one skilled in the art to modify the processes of Sassmannshausen et al. '768 which includes pre-exposure and post exposure baking by using a two beam exposure process to form an relief grating based upon the use of

polyimides to form gratings using interferometric exposure as evidenced by IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), to use the resultant grating to emboss a grating surface in another surface based upon the direction to use resists to mold/emboss other soft materials as taught by Shvartsman '689, Kataoka et al. JP 08-039572 and to form the polyimide coating on rollers based upon the ability to perform continuous printing using the coating processes of McGrew '030 which are disclosed as useful in the printing arts by Fan et al. EP 0766142.

C) Claims 28, 32, 33, 35 and 43 axe rejected under 35 U.S.C. 103(a) as being unpatentable over Sassmannshausen et al. '768, in view of IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), Shvartsman '689, Kataoka et al. JP 08-039572, Fan et al. EP 0766142 and McGrew '030, and further in view of Abraham '282.

Abraham '282 teaches the formation of dot matrix gratings or regular gratings in photoresists and the use of these as stampers. (3/11-50)

In addition to the basis provided above, the examiner holds that it would have been
obvious to use the processes Sassmannshausen et al. '768 combined with IBM Technical
Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), Shvartsman '689, Kataoka et al. JP 08-
039572, Fan et al. EP 0766142 and McGrew '030, such as dot matrix holograms as tile

image to
be formed in the stampers based upon the teachings of the formation of these holograms in
stamper surfaces by Abraham '282 as these are known holograms formable using stamping.

D) Claims 28,33-36 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sassmannshausen et al. '768, in view of IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), Shvartsman '689, Kataoka et al. JP 08-039572, Fan et al. EP 0766142 and McGrew '030, and further in view ofHino et al. '469 and/or Hagan et al. '825.

Hino et al. '469 teach that if the heating temperature is below 400 degrees C, imidization does not sufficiently proceed, and to correct for this, curing takes place under a
nitrogen atmosphere (8/1-14).

Hagan et al. '825 teach the use of negative polyimide resists which are aqueous developable (16/11-37). This is described as an advantage over other polyimides, which cannot
use aqueous developers. The use of these compositions in forming microelectronics, photoresists
and printing plates is disclosed. (17/30-37).

It would have been obvious to modify the invention of Sassmannshausen et al. '768,
combined with IBM Technical Disclosure Bulletin Vol. 30(3) pp. 1392-1393 (08/1987), Shvartsman '689, Kataoka et al. JP 08-039572, Fan et al. EP 0766142 and McGrew '030 as
discussed above by curing under a nitrogen atmosphere to ensure sufficient imidization as taught
by Hino et al. '469 and/or the use a negative polymide resist which shares the advantage that it is
developable using a aqueous developer. There is no evidence that the polarity (negative acting
or positive acting) of the polyimide has any advantage.

(10) Response to Argument

On page 4 of 13 of the Appeal Brief of July 06, 2005, the appellant has argued that the examiner had improperly relied upon the “common knowledge and common sense of [a] person of ordinary skill in the art” citing In re Lee 61 USPQ 2d 1430 (Fed Cir. 2002). The appellant asked the examiner to point out in column and line, where the suggestion to combine may be found.

The IBM Technical Disclosure Bulletin forms a grating in a photosensitive polyimide which is cast upon on a flat surface, exposed and developed. The resulting grating is seamless and establishes that polyimide is capable of forming a grating/holographic pattern. The casting of the polyimide from solution upon a surface is found in the IBM Technical Disclosure Bulletin and in the Katoaka et al. reference which describes the coating of the photosensitive polyimide at ([0025-0029], translation at pages 15-17). The casting of UV or electron curable resins upon a holographic relief mold, followed by curing and separation of the mold and the UV cured replica is taught in Shvartsman et al. at 2/1-6, and this reference also establishes that holographic gratings can be formed by embossing an UV curable composition with a holographic stamper, curing using UV exposure and peeling results in a relief grating which can be used to transfer the relief image to another surface by stamping (8/56-9/21). This is a teaching of an additional utility for these surfaces, the benefit being that the relief surface need not be transferred to a more robust surface by further processing such as electroforming to function as a embossing surface (Shvartsman at 1/52-60 and 8/56-63). This establishes the known functional equivalence of a patterned UV exposure/development and an uniform UV exposure of a UV curable resin in contact with a grating/holographic relief (including either casting upon the relief surface or contacting the stamper after coating) in forming the desired relief surface in UVcurable resins. The Katoaka et al. reference teaches that after UV exposure to perform crosslinking, the photosensitive polyimide needs to be heated to 300 degrees C to become imidized and form the polyimide. ([0025-0029, 0035] translation at pages 15-17

& 19). The processing to form the polyimide grating relief image in a photosensitive precursor uses UV curing/crosslinking which is followed by heating. This evidences a compatibility with the UV curing taught by Shvartsman et al as the UV exposure would induce uniform crosslinking to fix the relief image into the polyimide precursor layer, which is followed by heating to form a fully cured/imidized relief image. Lastly, the use of the UV cured polyimide as the relief surface of the mold provides a reasonable expectation that the fully cured/imidized polyimide would be able to function in the same manner as described in Shvartsman et al., who specifically uses the UV cured film as an embossing master. This teaching is only a bit more on point that the teaching of Katoaka et al. with regard to molding liquid resins on the polyimide surface ([0035], translation at page 20) due to the specific use of UV curable resins.

On page 4 of 13 of the Appeal brief of July 6, 2005, the appellant states that the examiner has improperly relied upon common knowledge and common sense and that there is no motivation in the references. The issue of motivation and where the teachings are found in the references has been addressed above. In KSR International Co v. Teleflex Inc. 82 USPQ2d 1385 (Supreme Court), on page 1397 states that "Rigid preventative rule that deny fact finders recourse to common sense, however, are neither necessary under our case law nor consistent with it". The court specifically rejected the rigidly applied teaching, suggested, motivation (TSM) test applied in the cases cited by the appellant in KSR at pages 1396-1397.

On page 5 of 13 of the Appeal Brief, the appellant argued that the examiner has used hindsight to combine the references to find the invention obvious. In response to appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned **only** from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Based upon the specific teachings within the references applied in the rejection, it is clear that the appellant's disclosure is not the sole source of knowledge (teachings and motivation) used in the obviousness rejection.

On page 5 of 13 of the Appeal Brief, the appellant argues that the examiner did not consider Fan et al., EP 766142 fully, noting the direction away from high temperatures due to shrinkage and distortion of the substrate, which leads to mounting problems. The appellant argues that Fan et al. teach away from the high temperatures of the imidazation (300-400 degrees C) due to registration problems which could result. The Fan et al. reference applied a solid photopolymer coating and blends the seams and so adhesion is more of an issue than when using the spin/roller coating of McGrew. Therefore, one would not look to Fan et al., but rather McGrew which does not discuss such a problem. This alleged defect also does not seem be evidenced by Sassmannshausen et al., who use the polyimide as the photoresist on printing plate

surfaces in the process described at 6/23-7/39 or Katoaka et al. who use it a mold insert. One of ordinary skill in the art would have chosen substrate materials known in the art to be compatible with the curing process of the polyimide, rather than those disclosed in the art (Fan et al.) to be incompatible with heating. The Fan et al. reference is relied upon to bridge the teachings of Sassmannshausen et al. (printing plates) and the coating of embossing rollers taught by McGrew. The examiner notes that McGrew teaches the same process as Fan et al. and describes no such defects.

On pages 2-3 of 7 of the reply brief of June 13, 2007, the appellant states that IBM Technical Disclosure Bulletin, Shvartsman et al. and Katoaka et al. do not teach the recited casting process. The appellant appears to mis-characterize the IBM Technical Disclosure Bulletin slightly as it discloses coating probimide on a substrate, UV interference exposure and development to form a diffractive zone plate, and not casting it upon a zone plate. There is a disclosure of processes where "a relief mold" is coated with a UV curable resin, curing the resin and then removing the relief mold (Shvartsman at 2/1-6). This provides the teaching argued by the appellant as missing. Shvartsman et al. are better than the discussed JP 58144878 as the reference teaches both the curing in contact with the relief/mold surface and the subsequent use of the cured product to emboss/stamp other materials. Katoaka et al. also teach the contact of a liquid (polystyrene) resin with the mold surface ([0035], translation at page 20).

On page 4 of 7 of the reply brief, the appellant argues that the IBM Technical Disclosure Bulletin cannot be used in the combination due to its teaching of dry development. The IBM Technical Disclosure Bulletin states "Probimide 300 series (348 and 337), a product of Ciba-Geigy, is a photosensitive polyimide that is normally developed is a wet developer. However, upon exposure, this photosensitive polyimide can be developed by thermal heating, to generate a surface relief grating or modulation which is thermally stable." The reference does describe "In general, wet processing requires tight controls. Since the process window is narrow, in-situ monitoring of development processes is required ...." This is not the teaching away hoped for by the appellant as it clearly teaches that wet processing can be used and the precautions which should be taken. This argument treats the references separately and in doing so ignores the successful use of wet development of polyimides by Katoaka et al. ([0025-0029], translation at pages 15-17), Sassmannshausen et al. (6/23-7/39) and Hagen et al. (16/11-37). The art as a whole must be considered.

On pages 4-5 of the reply brief of June 13, 2007, the appellant argues that the Shvartsman reference does not relate to the invention based upon its use of stamping to impress the pattern into the photopolymerizable layer, as polyimides undergo crosslinking, not polymerization. This analysis fails to account for the fact that both the photopolymerization and the photo-crosslinking of polyimide precursor is induced by exposure to ultraviolet (UV) light, and that in both cases, this curing results in the exposed areas being rendered insoluble.

On page 5 of 7 of the reply brief, the appellant argues that the Fan et al. reference teaches away from the claimed invention which requires heating specifically taught away from in Fan et al. The appellant also points out that the Fan et al. reference uses photopolymerized thermoplastic materials and not the polyimide. The position of the examiner is that one of ordinary skill in the art would not have used the substrates described by Fan et al. as being unsuitable for heating and not disclosed for use with polyimide, but would have used materials known to be useful with polyimide and the processing of polyimide described by Katoaka et al. ([0025-0029], translation at pages 15-17), Sassmannshausen et al.. (6/23-7/39) and Hagen et al. (16/11-37), which include a thermal treatment to imidize the resin.

On pages 5-6 of 7 of the reply brief, the appellant argues that the examiner has not met the burden of establishing a prima facie case of obviousness establishing the presence of all the recited elements of instant claims 28 and 43, in the cited publication, motivation to combine from the references, and a reasonable expectation of success as determined from the position of one of ordinary skill in the art at the time the invention was made. In addition to the issues of teaching away raised by the appellant and addressed immediately above, the appellant states that there is no motivation to combine from the references. Sassmannshausen et al. '768 teach processing of polyimides for such uses as printing plates (1/11-30), including coating, prebaking (aka. heat pre-curing), exposure (at room temperature), wet development with an aqueous

alkaline solution and post-baking to harden/imidize the polyimide precursor (6/37-7/39). It does not teach that the printing surface can be a roller, the rotation/spinning of the roller in the polyimide precursor to form a seamless coating, the interference exposure or embossing another surface with the resultant fully imidized relief hologram. Fan et al. EP 766142 establish that printing surfaces can be cylinders/rollers and describes seamless resist coatings and that roller allow the use of continuous printing processes (5/9-17, & 2/30-34). McGrew et al. '030 teach forming seamless coatings using a rolling/spin coating process and this is disclosed as useful for both printing plates and embossing as it allows the implementation of continuous embossing processes (1/44-54, 2/56-59, 4/25-46 & 6/66-17). The motivation to move to a roller type printing plate or embossing mandrel is the ability to use it in continuous processes as articulated by Fan et al. and McGrew, and to do this, one needs to have the ability to form a seamless photosensitive coating using the spin/rolling coating methods disclosed by McGrew. The interference exposure is taught by IBM Technical Disclosure Bulletin which gives one of ordinary skill in the art a reasonable expectation of being able to record grating/holographic patterns in photosensitive polyimides, and McGrew establishes the desirability of embossing rollers to continuously embossing diffractive articles. The teachings of Shvartsman '689 and Kataoka et al. JP 08-039572 establish that the relief surfaces formed in these UV patterned materials can be used to form relief surfaces in other materials with Kataoka et al. JP 08-039572 specifically showing this for a photosensitive polyimide and provide a benefit over the process of McGrew in that the

etching process need not be performed as the polyimide can be used as the embossing surface for soft materials.

On pages 5-6 of 7 of the reply brief, the appellant points to use of 6 references. In response to appellant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

On page 6 of 7 of the reply brief, the appellant points to addition of a seventh reference in the rejection. The examiner has addressed the issue of the number of references used above. That response is relied upon, rather than be repeated here.

On page 6 of 7 of the reply brief of June 13, 2007, the appellant argues that Abraham is used for mastering optical disc and mere discussion of dot matrix usage is not enough to justify combination with the other references. This argument fails to account for the fact that the particular optical disk includes **both** digital and holographic information as clearly illustrated in figures 2 and 3. Based upon the teachings the formation of **stampers** for **holographic information**, the reference is analogous to the others applied either through the nexus of the molding/stamping arts or the holographic art. The appellant's position for the claims being patentable based upon the type of hologram recorded is without merit. The examiner notes that the type of holograms recited in previously known in the holographic art and so does not constitute and advance in the art, but would occur "in the ordinary course" as discussed in KSR Inetenational Co. v. Teleflex Inc., 82 USPQ2d 1385 (127 SCt 1727 (2007) at page 1385.

Contrary to the position of the appellant the references are not divergent and relates to each other on the basis of forming holograms and/or the use of stamping.

On page 7 of 7 of the reply brief, the appellant seems to imply that only a single reason can be used in the combination of references. Clearly different reasons would be needed for different modifications. The appellant has asserted that the basis for combination is not supported with evidence. The position of the examiner is that one of ordinary skill in the art would naturally look to the polyimide art when determining the conditions for imidization to polyimide precursors and that Hino et al. and Hagen et al. constitute such prior art to which one of ordinary skill in the art would be drawn. The examiner has addressed the issue of the number of references used above. That response is relied upon, rather than be repeated here.

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Martin J Angebranndt/

Primary Examiner, Art Unit 1795

_____

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09/10/2008